THE WESTERN AUSTRALIAN
NATURALIST

Vol. 24 30th September 2004 No. 3

TWO NEW SPECIES OF *STYLIDIUM* (STYLIDIACEAE) FROM THE SOUTH-WEST OF WESTERN AUSTRALIA

By ALLEN LOWRIE
6 Glenn Place, Duncraig, Western Australia, 6023.

and

KEVIN F. KENNEALLY
LANDSCOPE Expeditions, Department of Conservation and Land Management, Locked Bag 29, Bentley Delivery Centre, Western Australia 6983.

ABSTRACT

Lowrie, A. and Kenneally, K.F. Two new species of *Stylidium* (Stylidiaceae) from the south-west of Western Australia, *The Western Australian Naturalist* 24(3): 153–163 (2004).Two new triggerplant species, *Stylidium trudgenii* and *Stylidium turleyae* Lowrie & Kenneally, are described and illustrated. Both are endemic to the south-west of Western Australia.

INTRODUCTION

Two new south-western Australian species are described here as *Stylidium trudgenii* and *Stylidium turleyae*. They belong to subgenus *Tolypangium* (Endl.) Mildbr. section *Saxifragoidae* Mildbr. which is characterized by having rosetted linear to obovate-spathulate leaves and racemose or paniculate inflorescences.

TAXONOMY

Stylidium trudgenii Lowrie & Kenneally, *sp. nov.*

Stylidio caespitoso R. Br. affinis sed foliis linearibus margine integro, apice acuto sed non pungenti; lobis posterioribus corollae 7–8 mm longis; hypanthio dense glanduloso; sepalis duobus $^2/_3$ connatis, sepalis tribus ad basim

libris; sepalis omnibus ad basim glandulosis differt.

Typus: cultivated material ex *c.* 5 km north of Ellenbrook estate, 31° 45'25" S, 115° 57'39"E, Western Australia, 23 Oct. 2000, *A. Lowrie* 2520 (*holo:* PERTH 06704832; *iso:* MEL).

A basally rosetted caespitose perennial *herb* 36–45 cm (mostly 40–42 cm) tall including the scape and inflorescence; leafy rosettes 5–14 cm diam. (mostly 8–10 cm diam.), mostly in compact clusters of 3–8 rosettes, basal rosettes ± 40–50 leaved, leaves mostly prostrate to the soil surface and irregularly positioned within the rosette, all leaves arising from rosette node(s) situated below or just above the soil surface, dead leaves eventually deciduous. *Leaves* , linear, apex pointed but not sharp, the very tip white, 2.5–7 cm long, 1–1.5 mm wide, mostly ± allantoid in section, adaxial surface concave, abaxial surface convex, some leaves lenticulate in section, margins entire, glabrous, green to dark green often additionally mottled with red and appearing blackish in parts especially along the margins and at the leaf tips. *Inflorescence* 1 per leafy rosette, paniculate, 8–18-flowered, 35–44 cm long (including scape), green tinged with brown throughout but more so near the base, glabrous throughout, except for glandular-pubescent indumentum between the bracteoles and sepal bases. *Floral bracts* linear, 4–8 mm long, 0.6–1 mm wide, glabrous; *peduncles* of paniculate inflorescence 1–3-flowered, 2–18 cm long, the lower peduncles are longer, glabrous; *bracteoles* linear, 2–3 mm long, 0.2–0.3 mm wide, glabrous; *pedicels* 5–8 mm long, glandular-pubescent. *Hypanthium* green and brownish at base, ± narrowly obovoid, 3.5–4.5 mm long, 1.4–1.7 mm diam. at anthesis, glandular-pubescent, trichomes translucent white, glands brown. *Calyx* of 5 sepals, 3 free, 2 connate from the base for two thirds of their length, green, 2.2–3 mm long, each free sepal *c.* 0.6 mm wide, connate sepals *c.* 1.2 mm wide, glandular-pubescent at the base only, remainder glabrous. *Corolla* cerise (R.H.S. colour chart red-purple group 72b), with irregular blood-red marks near the base of the lobes, abaxial surface pink, cerise along the mid-vein areas, glandular-pubescent, lobes laterally paired; anterior lobes obovate, 5.5–6.5 mm long, 2.7–3 mm wide; posterior lobes narrowly elliptic, 7–8 mm long, 2.7–3 mm wide. *Throat* white, surrounded by 2 opposite reddish orange blotches, separated by a smooth pearly white mirror-mound bearing a tiny red apical appendage at its apex (on the bases of the posterior lobes), and further surrounded by 2 opposite smaller blood-red blotches (on the bases of the anterior lobes), a solitary cerise coloured conical throat appendage *c.* 0.4 mm long present within the white coloured throat zone near the base of the left anterior lobe, opposite lobe without a similar appendage but bearing a bump-like ridge. *Labellum* boss green tinged with brown, ovate, convex, 1–1.2 mm long, 0.5–0.6 mm wide, smooth; apical point, 0.3–0.4 mm long, margins *c.* 0.1 mm wide, both blood-red, papillose; basal appendages linear ± triangular,

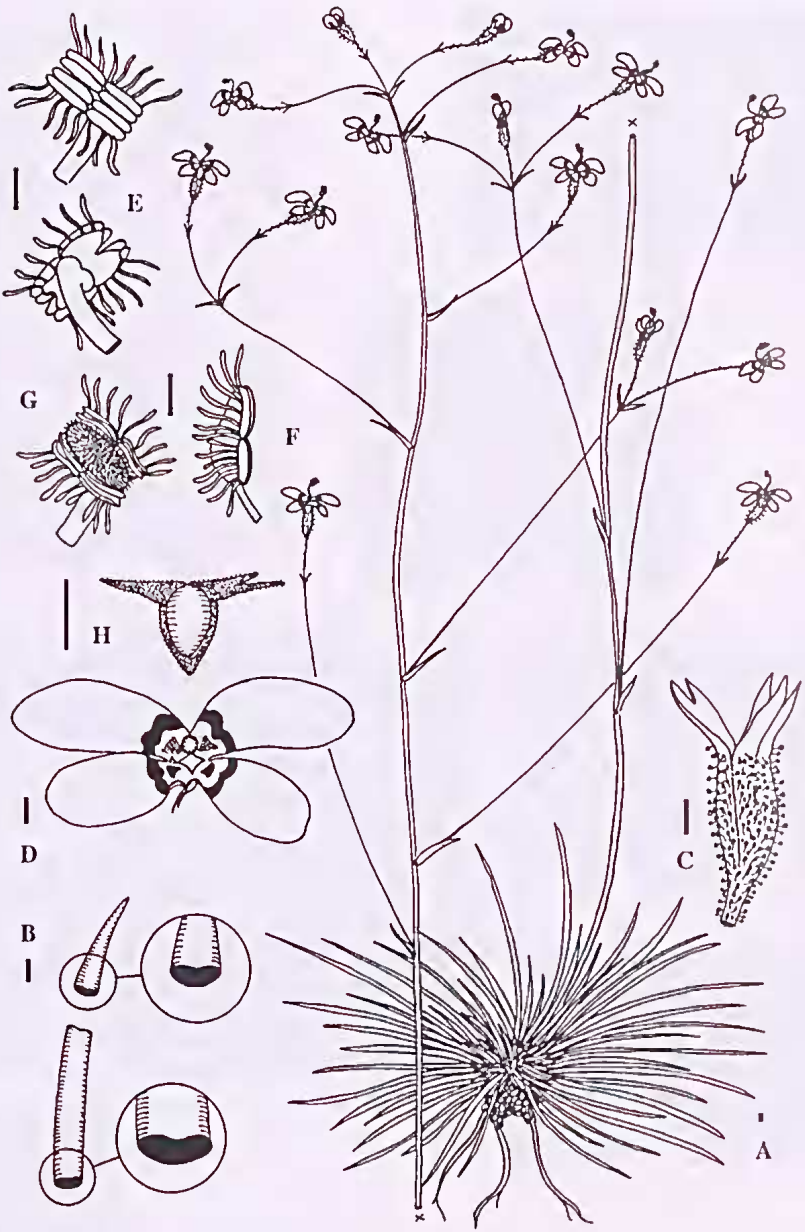

Figure 1: *Stylidium trudgenii* Lowrie & Kenneally. A. habit of flowering plant; B. leaf; C. hypanthium; D. corolla; E. face view of gynostemium tip (top), back view of gynostemium tip (bottom); F. side view of gynostemium tip; G. face view of gynostemium tip with stigma grown out; H. labellum. Scale bars for all = 1 mm. Drawn from live material from type location, Ellenbrook, Western Australia by A. Lowrie 2001. Voucher *A. Lowrie* 2520 (PERTH).

often either one of the pair is apically forked, green tinged brown, 1.2–1.5 mm long, papillose. *Gynostemium* green at the base remainder reddish brown, *c.* 14 mm long, *c.* 0.5 mm wide at the base tapering to *c.* 0.3 mm wide at its apex, glabrous; anthers blackish maroon, laterally paired, abaxial surface margins bearing translucent white moniliform projections *c.* 1 mm long, pollen cream; stigma green, elliptic, cushion-like, *c.* 2.5 mm long, *c.* 1 mm wide. *Capsule* ± ellipsoid, longitudinally slightly compressed, *c.* 6 mm long, *c.* 3.5 mm wide. *Seeds* rust orange, ± confined within the overall shape of an obovoid figure, longitudinally ± 4-sided and slightly channeled from pole to pole, 0.5–0.6 mm long, 0.3–0.4 mm diam., attached to a cylindrical funicle *c.* 0.1 long, *c.* 0.2 mm diam., surface minutely muricate.

Distribution. Known from the type location and a small number of nearby swampland depressions.

Habitat. At the type location grows in black peaty soil on a winter-wet swamp margin.

Phenology. Flowering late October to early November. Mature seed shed by December

Conservation status. Priority Two. Known from the type location and nearby localities which are currently not under threat.

Etymology. The epithet *trudgenii* is named in honor of Malcolm Eric Trudgen, botanist and ecologist who discovered this species in wetlands north of Ellenbrook during a vegetation and flora survey.

Affinities. The closest relative to *Stylidium trudgenii* is considered to be *S. caespitosum* R. Br. *S. trudgenii* differs from *S. caespitosum* (whose contrasting characters are given in parenthesis) by having: all leaves linear with entire margins, apex pointed but not sharp (young leaves oblanceolate with minutely serrate margins, apex distinctly pointed and sharp, older leaves linear with minutely serrate margins especially near the base but often lacking in the upper parts); posterior corolla lobes 7–8 mm long (4–5 mm long); hypanthium densely glandular (sparingly glandular); 2 sepals connate for two thirds of their length, 3 sepals free to their base (all sepals free to their base); and all sepals glandular at base (all sepals glabrous).

Ecologically both species occur on winter-wet swamp margins or swampland depressions where they often experience shallow flooding. At many locations along the south coast *Stylidium caespitosum* also inhabits the banks of fast flowing winter-wet creeks. During winter, populations of this species at these locations are often covered for short periods by deep running water.

Our present knowledge demonstrates that both species are geographically separated from each other by *c.* 280 km. *Stylidium caespitosum* occurs in near coastal regions on the south coast of south-western Australia between Augusta and Manypeaks. It has also been found at Palgarup north of Manjimup. *Stylidium trudgenii* is only known from the Ellenbrook region north of Perth.

A

D

E

B

F

G

C

Plate 1: *Stylidium trudgenii* Lowrie & Kenneally. A, live type specimen before pressing, scale in 1 cm divisions; B, comparison between *S. trudgenii* (two large pink flowers) and *S. caespitosum* (smaller white flowers); C, close-up of the leaves; D, adaxial surface of corolla; E, abaxial surface of corolla; F, side view of corolla with gynostemium triggered; G, side view of corolla with gynostemium set. All scans and digital photos by A. Lowrie.

Notes. Flowering material of *Stylidium trudgenii* was unavailable in its year of discovery in 1999 due to the lateness of the season. Specimens were collected from the field at this time and grown in a greenhouse by one of us (A.L.) where they flowered in October 2000. Part of this flowering material was processed to form the herbarium voucher specimens (*A. Lowrie* 2520) of the type and isotypes for this species.

Specimens of the closely related species *Stylidium caespitosum* (*A. Lowrie* 172 (PERTH 06729789)) that had been collected from near Elleker, west of Albany, were also grown in cultivation for comparison with the cultivated material of *S. trudgenii*.

Stylidium turleyae Lowrie & Kenneally, *sp. nov.*

Stylidio assimili R. Br. affinis sed foliis linearibus vel angustissime oblanceolatis margine integro, sub anthesi erectis vel semi-erectis; hypanthio ellipsoideo, 4.5–5 mm longo; accessioribus basalibus labelli 0.4–0.7 mm longis; apice abaxiali gynostemio projecturis moniliformibus post antheram praedito differt.

Typus: Mason Bay Rd, E of Hopetoun, Western Australia, 33° 55'19"S, 120° 25'27"E, 22 Oct. 2000, *A. Lowrie* 2533 (*holo:* PERTH 06729614; *iso:* MEL).

A basally rosetted caespitose perennial *herb* 15–30 cm (mostly 25–30 cm) tall including the scape and inflorescence; leafy rosettes 5–7 cm diam., solitary or in clusters of 2–5 rosettes, leaves of the basal rosettes irregularly positioned within the rosette, some leaves erect (inner younger leaves) to semi-erect (older outer leaves), all leaves arising from rosette node(s) situated below or just above the soil surface, dead leaves eventually deciduous. *Leaves* fleshy, linear to very narrowly oblanceolate, 2–3.5 cm long, 1–2 mm wide, ± lenticulate in section, adaxial surface convex, abaxial surface with a slightly raised and rounded longitudinal mid vein ridge for much of its length, basal and apical parts convex, glabrous, green. *Inflorescence(s)* 1–2 per rosette, racemose or paniculate, 25–75-flowered, 23–28 cm long (including scape), green throughout, indumentum glandular-pubescent. *Floral bracts*, narrowly obovate, 3–8 mm long, 0.5–1 mm wide, glandular-pubescent; *peduncles* of paniculate inflorescences 2–12-flowered, 1.5–3.5 cm long, the longer ones low on the inflorescence, glandular-pubescent; *bracteoles* linear, 2–2.5 mm long, 0.3–0.4 mm wide, glandular-pubescent; *pedicels* 5–15 mm long, glandular-pubescent. *Hypanthium* green, ± narrowly ellipsoid, 4.5–5 mm long, 2–2.5 mm diam. at anthesis, glandular-pubescent. *Calyx* of 5 free sepals, green, 2.5–3 mm long, *c.* 0.8 mm wide, glandular-pubescent. *Corolla* pink, with irregular purple marks near the base of the lobes, abaxial surface wine red bordered by a narrow margin of white, glandular-pubescent, lobes laterally paired; anterior lobes narrowly elliptic, 4–4.5 mm long, 2–2.3 mm wide; posterior lobes narrowly elliptic, 5.5–6.5 mm long, 2.7–3 mm wide. *Throat* white,

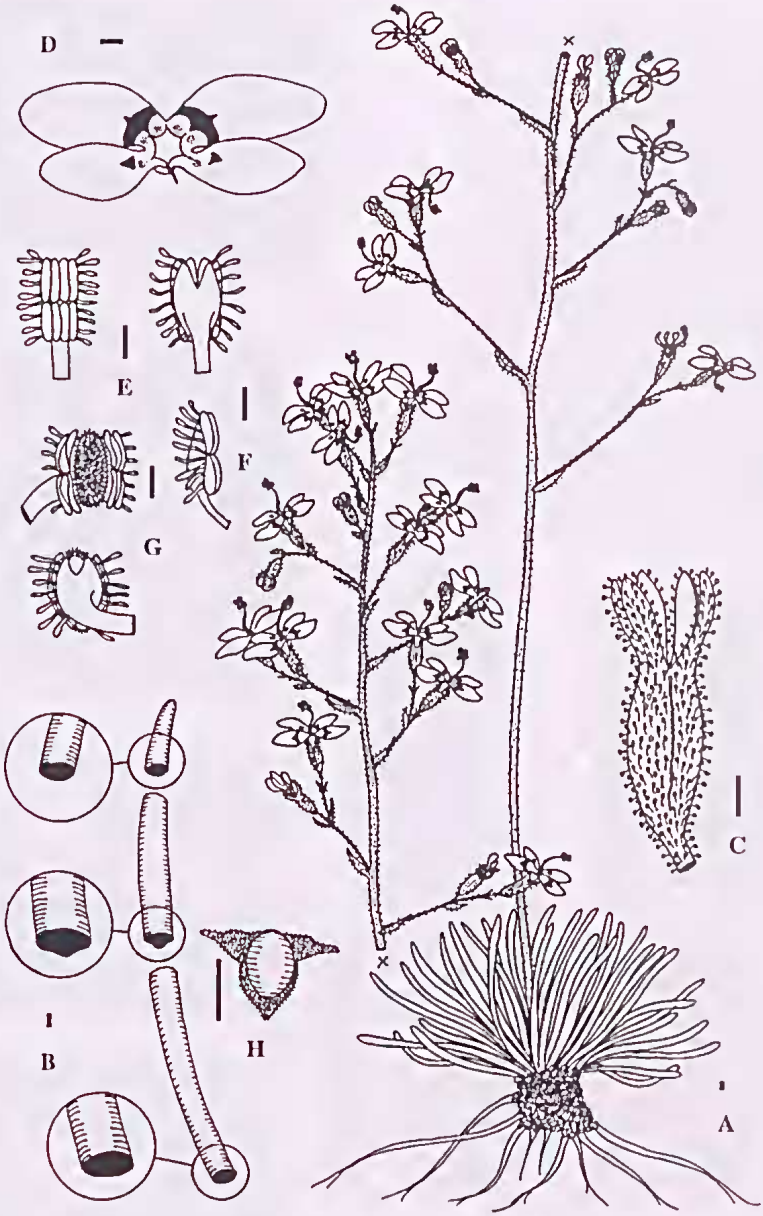

Figure 2: *Stylidium turleyae* Lowrie & Kenneally. A. habit of flowering plant; B. leaf; C. hypanthium; D. corolla; E. face view of gynostemium tip (left), back view of gynostemium tip (right); F. side view of gynostemium tip; G . face view of gynostemium tip with stigma grown out (top), back view of gynostemium tip with stigma grown out (bottom); H. labellum. Scale bars for all = 1 mm. Drawn from live material from east of Hopetoun, Western Australia by A. Lowrie 2001. Voucher *A. Lowrie* 2549 (PERTH).

A

F

G

B

E

H

C

D

I

Plate 2. *Stylidium turleyae* Lowrie & Kenneally. A, live type specimens before pressing, scale in 1 cm divisions; B, side view of corolla with gynostemium set; C, gynostemium triggered, at mid point of its travel; D, gynostemium triggered, at the end of its travel; E, close-up of leaf; F, abaxial surface of corolla; G, side view of corolla with stigmatic gynostemium tip; H, adaxial surface of corolla, gynostemium set; I, adaxial surface of corolla, gynostemium triggered. All scans by A. Lowrie.

surrounded by 4 separate yellowish orange blotches, throat appendages absent. *Labellum* boss pale green tinged brown, elliptic, convex, *c.* 1 mm long, *c.* 0.8 mm wide, smooth; apical point, *c.* 0.2 mm long, along with margins dark red, papillose; basal appendages ± triangular, pale green tinged brown 0.4–0.7 mm long, papillose. *Gynostemium* green tinged brown, *c.* 12.5 mm long, *c.* 0.5 mm wide at the base tapering to *c.* 0.3 mm wide at its apex, glabrous; anthers maroon, laterally paired, abaxial surface margins bearing translucent white moniliform projections, pollen pale yellow; stigma green, elliptic, cushion-like, *c.* 2 mm long, *c.* 0.5 mm wide. *Capsule* ± broadly ellipsoid, longitudinally slightly compressed, 5.5–7 mm long, 3–5 mm wide. *Seeds* brown, ± confined within the overall shape of an obampulliform figure, 0.7–0.9 mm long, 0.45–0.5 mm diam., the narrow basal part being the funicle *c.* 0.15 mm long, 0.2 mm diam., with the dilated part longitudinally 4-furrowed from pole to pole, each furrow being equally distant from each other around the circumference to form a distinctive 4-lobed figure in plan view, surface minutely foveate (seed description from DEM 2954).

Other specimens examined. WESTERN AUSTRALIA: Roe Botanical district, 8.5 km SSW of Mt Buraminya, 33° 18'S, 123° 06'E, 27 Jun. 1992, *W.R. Archer* 2706926 (MEL); S portion of loc. 1159, *c.* 37 km N of Munlinup River Crossing on Ravensthorpe-Esperance main road, 15 Oct. 1968, *N.N. Donner* 3039 (K); W end of Helms Arboretum, Esperance, 33° 43'40"S, 121° 46'37"E, 2 Dec. 1997, *A. Lowrie* 2022 (PERTH, MEL); Long Creek Rd, W of Ravensthorpe, 33° 28'59"S, 119° 48'33"E, 25 Sep. 2003, *A. Lowrie* 2842 (PERTH, MEL); Cascades Rd near Cascade wheat silo, 33° 28'12"S, 121° 04'03"E, 11 Oct. 2003, *A. Lowrie* 2865 (PERTH, MEL); junction of Cascades Rd and Edwards Rd, 33° 24'07"S, 120° 58'18"E, 11 Oct. 2003, *A. Lowrie* 2866 (PERTH, MEL); Esperance Bay and Cape Pasley, *c.* 1847, *Maxwell s.n.* (K); 10 km W of Orleans Farm, 33° 45'22"S, 122° 46'05"E, 13 Oct.1997, *D.E. Murfet* 2942 [dwarf specimens] (PERTH, MEL); Seal Creek campground, Cape Arid, 33° 54'53"S, 123° 20'00"E, 14 Oct.1997, *D.E. Murfet* 2954 (PERTH, MEL); Helms Arboretum, along maintenance track, Esperance, 33° 43'S, 121° 46'E, 22 Nov. 1997, *C. Turley s.n.* (PERTH).

Distribution. Occurs between the eastern region of Fitzgerald River National Park and in various coastal locations to the east across to Cape Pasley, a distance of *c.* 380 km. Additional locations can be found inland *c.* 135 km north east of Fitzgerald River National Park in the Cascade region as well as Mt Buraminya 80 km north of the coast from Cape Arid.

Habitat. Variously recorded on the herbarium specimens as growing: amongst *Melaleuca* species and *Banksia media*; in white silica sand with a little humus with *Melaleuca* species in winter-wet shrub heathland; in clay loam soils with *Banksia* and *Melaleuca* species; in clayey white sand with *Eucalyptus* species; in blackish soils near *Melaleuca* species.

Phenology. Flowering October to early November. Mature seed shed by mid December.

Conservation status. Common and currently not under threat.

Etymology. The epithet *turleyae* is named in honor of Coral Dawn Turley, botanical enthusiast from Esperance who discovered this species in the Esperance region and brought it to our attention.

Affinities. Closest relative to *Stylidium turleyae* is considered to be *S. assimile* R. Br. Both have fleshy leaves, paniculate inflorescences having an overall glandular pubescent indumentum, pink laterally paired corolla lobes without throat appendages. *S. turleyae* differs from *S. assimile* (whose contrasting characteristics are given in parenthesis) in having: leaves linear to very narrowly oblanceolate in outline (leaves narrowly spathulate), with entire margins (margins minutely serrate), leaves within the rosettes held erect and semi-erect above the soil surface at anthesis (all leaves prostrate); an ellipsoid hypanthium 4.5–5 mm long (*c.* 2.5 mm long); a labellum bearing basal appendages 0.4–0.7 mm long (*c.* 1.5 mm long); and a gynostemium bearing marginal moniliform projections behind the anthers at its tip (projections absent).

Ecologically both species occupy different moisture gradients in their preferred habitats. During anthesis *Stylidium turleyae* in near coastal regions is generally found in the slightly moist soils that occur on higher ground surrounding winter-wet locations. This species also occurs much further inland such as the Cascade region where it grows in well drained sands that are moistened only by rainfall. In these drier locations *S. turleyae* can be found in full flower at the time the soil is quite dry. *S. assimile* by contrast prefers to grow as well as flower in very wet locations such as seepage areas, shallow water running rivulets and shallow flooded swampland margins.

Notes. Earlier collections of *Stylidium turleyae* such as those gathered by Maxwell *c.* 1847 have been treated by previous authors as *S. assimile.* With only herbarium specimens of *S. turleyae* to base their findings on these previous researchers can be forgiven for their erroneous findings. It has only been with knowledge gained from the many studies on the changing life forms of both species, over a number of seasons in the field and cultivation, that the morphologically different characters of both species could finally be ascertained.

ACKNOWLEDGEMENTS

We would like to thank Malcolm Trudgen for sharing his discovery with us and for accompanying one of us (A.L.) back to the first discovery station and now the type location for *Stylidium trudgenii.* We would also like to thank Coral Turley for bringing to our attention her *Stylidium* collections from the Esperance region. Paul Wilson for his assistance with the Latin diagnosis; Dr Barbara Rye for her comments, the two referees for their comments and suggestions and the Western Australian

Herbarium for access to the collections.

REFERENCES

BROWN, R. 1810. *Prodromus Florae Novae Hollandiae et Insulae Van-Diemen.* Taylor, London; facsimile edition 1960, H.R. Engelmann (J. Cramer), Weinheim, and Wheldon & Wesley, Codicote.

MILDBRAED, J. 1908. Stylidiaceae. *In:* Engler, A. (ed.) "Das Pflanzenreich." Vol. IV, 278 (35), pp. 1—98 (Engelmann: Leipzig.)

Royal Horticultural Society London. 1966. R.H.S. Colour Chart in association with the Flower Council of Holland. Published by The Royal Horticultural Society, London and Flower Council of Holland, Leiden.